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Ault-Riche *et al.*
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Q10 polypeptide tags for which the capture agents are specific. Also provided are methods of nested sorting using the collections. The methods include the steps of creating tagged collections of molecules by introducing a set of nucleic acid molecules that encode unique preselected polypeptides to create a library of tagged molecules; either before or after introducing the tags, dividing the library into N divisions; translating each division and reacting each with one of N capture agent collections, identifying the capture agents bound to the polypeptide tags linked to molecules of interest, and thereby identifying the one of the divided collections that contains the molecules of interest. The method can further include adding a new set of tags and repeating the sorting process with the same or a different collection capture agents and thereby identifying a protein or molecule of interest.

IN THE CLAIMS:

Please replace claims 1, 16, 38, 44, 45, 46, 67, 68, 72, 88, 94, and 98 with the following amended claims (a marked up copy of the amended claims is attached to this Amendment):

Q11 1. (Amended) A combination, comprising:
a plurality of capture agents, wherein each capture agent specifically binds to a polypeptide; and
a plurality of oligonucleotides that each comprises a sequence of nucleotides that encodes a preselected polypeptide,
wherein:
the preselected polypeptides encoded by the oligonucleotides comprise the polypeptides to which the capture agents bind; and
the oligonucleotides are single-stranded, double-stranded or partially double-stranded.

Q12 16. (Amended) The combination of claim 15, wherein the common region is 3' of the epitope-encoding region and/or of the divider region.

Q13 38. (Amended) A set of oligonucleotides comprising formula:

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5'-D_n-E_m-3'

wherein:

each D is a unique sequence among the set of oligonucleotides and contains at least about 10 nucleotides;

each E encodes a sequence of amino acids that comprises epitope;

each epitope is unique in the set;

each epitope is a sequence to which a capture agent binds;

each of n and m is, independently, an integer of 2 or higher; and

the oligonucleotides are single-stranded, double-stranded, and/or partially double-stranded.

44. (Amended) A combination of sets of oligonucleotides, comprising the set of oligonucleotide of claim 42 and another set of oligonucleotides of formula:

5' C-D_n 3', wherein C is a sequence of nucleotides common to all oligonucleotides in the set.

45. (Amended) A combination of sets of oligonucleotides, comprising the sets of oligonucleotides of claim 43 and another set of oligonucleotides of formula:

5' C-E_p-FA_s 3', wherein:

E_p is one of the E₁-E_m epitope-encoding oligonucleotides;

FA_s comprises a sequence of nucleotides that contains a sufficient portion of E_p to amplify nucleic acids, if it is used as a primer, that contains E_p, but insufficient to encode the epitope encoded by E_m;

each of s and p is an integer of 2 or higher up to m.

46. (Amended) A combination of sets of oligonucleotides, comprising the sets of oligonucleotides of claim 44 and another set of oligonucleotides of formula:

5' C-E_p-FA_s 3', wherein:

E_p is one of the E₁-E_m epitope-encoding oligonucleotides;

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Q14
CONT each FA_s comprises a sequence of nucleotides that contains a sufficient portion of E_p to amplify nucleic acids, if it is used as a primer, that contains E_p, but insufficient to encode the epitope encoded by E_m;

each of s and p is an integer of 2 or higher up to m.

67. (Amended) A method for screening a nucleic acid library, comprising:

- a) creating a tagged library by the method of claim 63;
- b) translating the library or a sublibrary thereof;
- c) contacting proteins from the translated library or sublibrary with a collection of capture agents to produce complexes between the tagged proteins and capture agents, wherein:

each of the capture agents specifically binds to a polypeptide encoding an E_m; and

each of the capture agents is identifiable;

Q15 d) screening the complexed capture agents to identify those that have bound to a translated protein of interest, thereby identifying the E_m that is linked to the protein of interest.

68. (Amended) The method of claim 67, further comprising:

e) isolating the nucleic acid molecules encoding the E_m linked to the protein of interest.

Q16 72. (Amended) The method of claim 71, wherein the particles are optically encoded.

Q17 88. (Amended) The method of claim 87, wherein the label is optical, chromogenic, luminescent, chemical, fluorescent or electronic.

Q18 94. (Amended) The combination of claim 29, wherein n is from about 2 up to and including 10⁵.

Q19 98. (Amended) The method of claim 96, wherein the collection of capture agents comprises antibodies.